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A systematic approach to private debt allocation in institutional portfolios

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Introduction

This paper aims to provide an overview of private debt investment opportunities and introduce a systematic framework for optimizing private debt allocations in institutional portfolios. It consists of three key components:

1. First, we model the risk and return considerations for a comprehensive range of private debt assets. Due to the unique nature of private markets, it is challenging to find measures that can reflect fundamental drivers while remaining consistent with the risk-return metrics for portfolio construction in public markets. We propose using net credit spread and credit stress loss as return and risk measures as they satisfy both requirements.
2. Second, we determine what we believe to be the ideal composition of private debt portfolios at different levels of target return using a robust optimization approach with capacity constraints. Through a case study, we demonstrate how investors can effectively integrate private debt into a 60/40 portfolio to achieve various investment objectives such as enhancing returns or reducing risk.
3. Last, we discuss the implementation of a private debt allocation and ways to enhance risk-reward using dynamic and opportunistic levers.

The private debt investment landscape

Building robust portfolios has always been a core objective for investors. In recent decades, the traditional 60/40 portfolio has been able to broadly achieve this, supported by falling rates and stable inflation. However, the outlook going forward could be less ideal. In this uncertain and challenging environment, many institutional investors believe that a well-diversified portfolio with alternative assets offers the potential to enhance risk-adjusted returns and provide resilience.

One asset class that has seen growing institutional interest in this context is private debt. With a large and heterogeneous universe, it presents a rich opportunity set for attractive absolute returns and diversification across fundamental drivers. Despite the increasing attention, however, public information on the asset class remains limited. This paper aspires to shed light on the private debt landscape, present a fundamental approach to evaluate risk-reward across segments, and obtain a private debt allocation tailored to investors' needs.

While corporate direct lending is the most established market, the wider private credit universe has developed over time to include a spectrum of opportunities. The universe can broadly be characterized along two key dimensions: position in the capital structure, and collateral type. As illustrated in **Figure 1**, financing needs covered by private credit go beyond corporate debt and include real assets such as real estate and infrastructure debt, but also niche specialty finance segments such as net asset value (NAV) financing and equipment leasing. Credit assets range from senior debt, which ranks highest in the

FIGURE 1: THE PRIVATE DEBT LANDSCAPE EXTENDS OVER A BROAD RANGE OF STRATEGIES, COLLATERAL TYPES, REGIONS AND LEVELS OF SENIORITY

PRIVATE DEBT					
Established credit markets			Specialty finance		
Corporate direct lending	Real estate	Infra	Asset-backed: tangibles	Asset-backed: intangibles	Other corporate lending
US	US	US	• Equipment leasing • Aviation • Shipping • Trade finance	• Lending to lenders • Litigation • IP & royalty • Receivables / payables • Regulatory capital • Nav lending • Natcat QS / WAQS • ILS (Cat bonds)	• Capital solutions • Venture debt • Healthcare lending • Software lending • GP finance • CLO MEZZ • Long short credit • Short duration HY
EU	EU	EU			
ROW	ROW	ROW			
Across capital structure: senior, junior, mezzanine and from performing to non-performing					

Sources: StepStone Group and GIC, as of June 2023.

capital stack, to second lien and mezzanine, which are junior, and preferred equity, which lies just above common equity and often possesses hybrid debt-equity characteristics. Finally, nonperforming credit or restructurings possess more equity-like characteristics.

Private debt assets are generally expected to offer higher returns relative to public credit, reflecting risk premiums arising from illiquidity and accessibility. Within the private debt realm, more niche specialty finance as well as opportunistic and distressed assets have the potential to offer even higher returns, further compensating for complexity and funding gaps. While this is generally true, each credit segment has unique and evolving market dynamics, requiring active monitoring of pricing and valuations across assets. In the implementation section, we will elaborate on how relative value may evolve and how investors can potentially enhance the returns of their private debt portfolios with a more dynamic and opportunistic approach.

In this study, we take a comprehensive approach to the private credit universe consisting of 13 main strategies, divided into 57 different sub-strategies and covering predominantly the US and Europe. For each sub-strategy, we maintain a set of 25 measures including spreads, loss rates, stress losses, duration, and annual deployment capacities, which are updated regularly. Each strategy offers a different risk-return profile with varying drivers and can thus play a different role in a strategic asset allocation. Using over 50 sub-strategies for assets allocation decisions is complex. To reduce that complexity and focus on core drivers for portfolio construction, we cluster sub-strategies into groups with similar risk-return profiles. This grouping of sub-strategies is done through a qualitative assessment of each strategy, a quantitative assessment of its correlations, and clustering techniques to identify similar risk-return profiles, as depicted in **Figure 2**.

Assessing return, risk and capacity for private debt

Once clusters have been defined, their key input parameters for asset allocation need to be determined. In this study, we separate credit spreads from risk-free rates when evaluating the returns of private credit investments. While a credit portfolio earns all-in yields from both components, credit and duration should be managed separately. The unique contribution of debt investments is their credit risk premium. Investors can earn risk-free fixed, or floating rate, returns from government bonds. In practice, insurance companies, for example, integrate the risk-free component of returns into the duration overlay to match their liabilities, while the credit risk is taken to generate a surplus return and tends to be managed against a stress loss budget.

We therefore think it makes sense to use net credit spreads, defined as gross spreads net of expected losses as well as from defaults, fees and costs, as the return measure for private credit. If allocations in foreign (e.g., non-domestic) currencies are considered, and a hedge is being implemented, the cross-currency basis needs to be reflected in the net spread calculation for such assets. The use of net spread reflects a simple and elegant "hold to maturity" projection of credit spread returns without assuming valuation changes as private debt investments are not traded frequently. For asset allocation, which tends to have a long-term horizon, we apply

FIGURE 2: CLUSTERING OF CREDIT STRATEGIES FOR THE PURPOSE OF ASSET ALLOCATION [4]

Asset class	Cluster	Strategy
Real estate	CRE senior & WL - EU	European investment grade - super senior (A+ rating)
		European investment grade - senior (BBB rating)
		European whole loan - unlevered
	CRE senior & WL - US	US investment grade - super senior (A+ rating)
		US investment grade - senior (BBB rating)
		US whole loan - unlevered
	CRE HY - EU	European whole loan - levered
		European mezzanine
	CRE HY - US	US whole loan - levered
		US mezzanine
Infrastructure	Infra IG - EU	European A rating
		European BBB rating
	Infra IG - US	US A rating
		US BBB rating
	Infra BB - EU	European BB rating
	Infra BB - US	US BB rating
	Infra B - Global	Global B rating
Corporate	SL - EU	European syndicated loans
	SL - US	US syndicated loans
	MM DL - EU	European upper, middle and lower middle market direct lending
	MM DL - US	US upper, middle and lower middle market direct lending
	TSL - EU	European traditional senior lending (BB internal rating)
	TSL - US	US traditional senior lending (BB internal rating)
	Mezz/2nd lien EU	European middle market mezzanine/ 2nd lien
	Mezz/2nd lien US	US middle market mezzanine/ 2nd lien
	OPP lending/distressed EU	European opportunistic lending
		European distressed
	OPP lending/distressed US	US opportunistic lending
		US distressed
Specialty finance	Specialty finance - low return[1]	
	Specialty finance - medium return[2]	
	Specialty finance - high return[3]	

Sources: StepStone Group and GIC, as of June 2023.

[1] 'Specialty Finance – Low Return' includes Net Spread lower than 400 bps, including Long Short Credit, Payable/Receivables, Short Duration HY (fixed), and ILS (Cat Bonds).
[2] 'Specialty Finance – Medium Return' includes Medium Return–500 < Net Spread < 700, including NAV Lending, DL Asia, Software Lending/ Venture Debt (fixed), Regulatory Capital, Shipping, Lending to Lenders, and Litigation Finance (fixed).
[3] 'Specialty Finance – High Return' includes High Return–Net spread > 750 including Equipment Leasing, EM Trade Finance, Multi Credit GPs, CLO, Royalties, NatCat QS/WAQS, Aviation, and Healthcare Lending.
[4] Depending on the type of asset allocation analysis, different levels of groupings might be useful (e.g. asset classes, clusters with strategies grouped along similar risk-return profiles or strategy level). For our SAA study, we use the clusters to reduce complexity and focus on core drivers for portfolio construction.

through-the-cycle net spread expectations[5] as shown in **Figure 3.**

The private debt market today offers a distinctly different outlook compared to long-term historical trends. The financing landscape has shifted with private lenders gaining market share relative to traditional lenders. With the retrenchment of bank lending activity, uncertainty in syndication markets and limited partners' (LPs') liquidity challenges, private credit spreads have widened. In the Tactical allocation chapter, we illustrate how current spread conditions differ from the long term and how returns can be enhanced by tactically tilting deployment based on relative risk-reward.

In addition to the return parameter, an appropriate risk measure for private credit needs to be defined. We propose the use of stress loss, defined as the worst expected 12-month credit loss due to defaults exceeding the long-term expected loss rate. Financial crises such as the Global Financial Crisis (GFC) typically see a higher magnitude of stress losses, although not all asset classes are impacted equally and not all suffered their worst losses during the GFC. This stress loss measure can be estimated consistently for both private and public credit. Through public credit, we can then integrate private debt into a multi-asset portfolio comprising other public market assets. Like return expectations, estimations of the stress loss for private credit segments require reliable data. Our estimates are calibrated using an extensive proprietary loan database tracking 22,500 single credits, with up to 150

FIGURE 3: LONG-TERM GROSS SPREAD, EXPECTED LOSS RATES, COSTS & FEES, AND NET SPREAD EXPECTATIONS PER CLUSTER

Sources: StepStone Group and GIC, as of June 2023. Long-term (5- to 10-year) capital market assumptions.

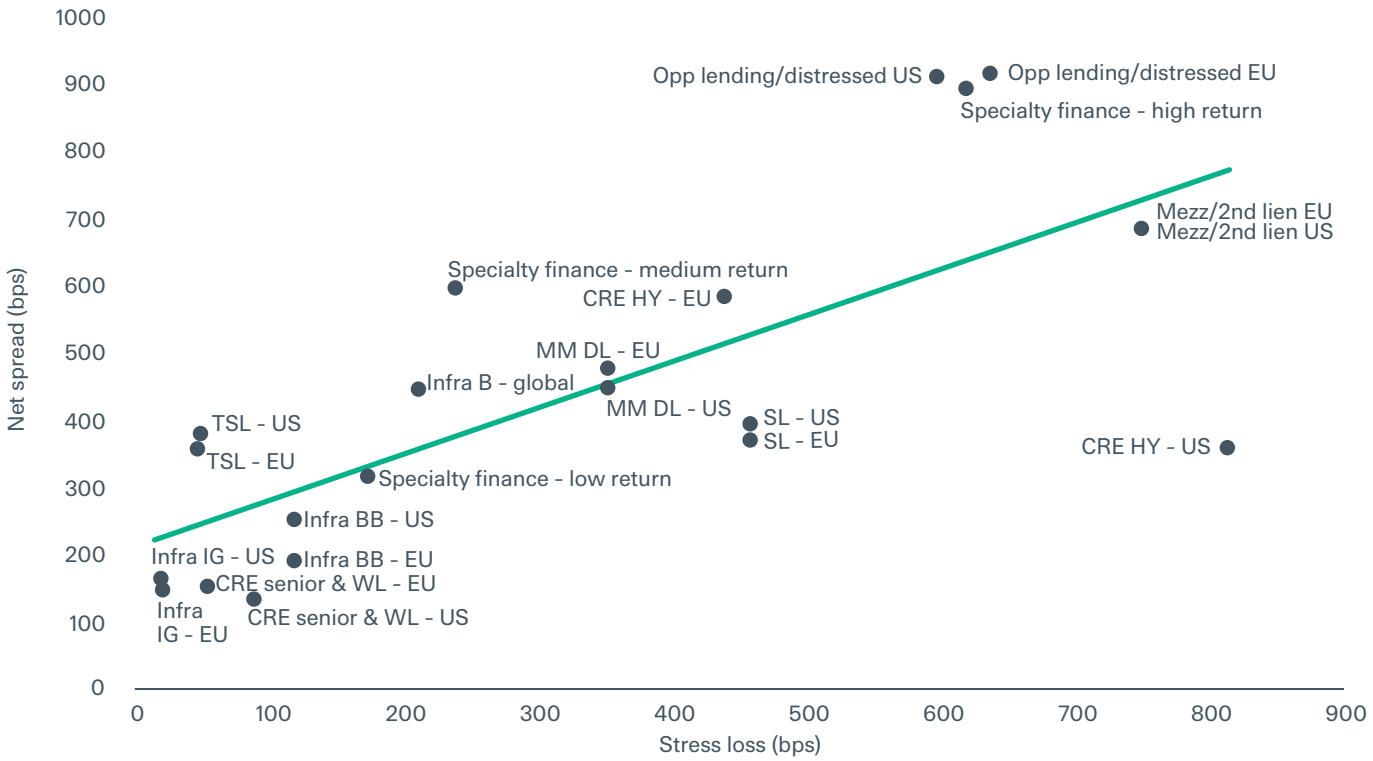
[5] The loss rate and fee/cost estimates are derived from a combination of StepStone track record analysis of comparable transactions, current market research and relevant market proxies.

data points per transaction. **Figure 4** shows our through-the-cycle capital market line (risk vs. return trade-off) for different private credit segments.

To construct diversified portfolios, understanding correlations is essential. However, estimating correlations for private debt risk is particularly challenging in the absence of a long history of stress periods to use as a reference point. To overcome this challenge, we use a time series of listed instrument indexes as a proxy for the estimation of correlations. The proxies used in our study are listed in Appendix A. While this approach can be criticized for not providing an accurate measure of private market loss correlation, we argue that they offer a more conservative set of estimates, because listed markets tend to show higher correlations during periods of stress. In addition, our framework can show undiversified stress losses if required.

Finally, we highlight capacity as an important input variable. In contrast to liquid markets, deployment in private markets takes time. Capacity with top-tier general partners (GPs) is constrained, and capital is not called instantaneously. Allocation to private debt needs to account for these features to find a solution that meets both deployment and return expectations. In this study, we integrate available capacity with top-tier GPs, coupled with deployment speed as a constraint in the portfolio construction process. The upper part of

FIGURE 4: CAPITAL MARKET LINE FOR PRIVATE DEBT CLUSTERS



Sources: StepStone Group and GIC, as of June 2023. Long-term (5- to 10-year) capital market assumptions.

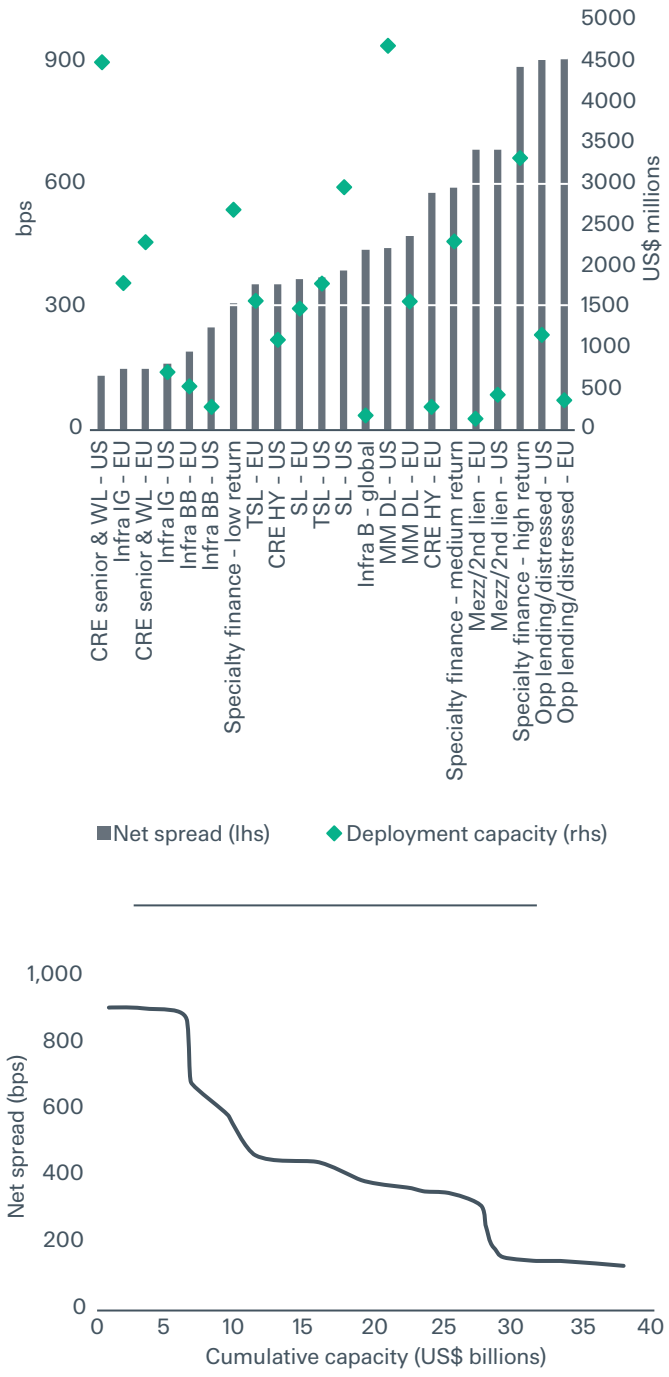
Figure 5 shows the net spreads and stress losses of private debt strategy clusters, together with their maximum yearly deployment capacity available in top-tier GPs. The lower part shows the maximum available deployment capacity per year above a certain net spread target. As the volume of capital to be deployed increases, investors need to integrate lower-yielding assets into the portfolio to achieve their deployment targets. Importantly, the chart reflects overall market capacity, and a single LP might not be able to absorb all that capacity. To highlight how capacity estimates may result in different private debt compositions and risk-reward, we model a large US$30 billion allocation to private debt, with a deployment of US$6 billion per year over five years.

Depending on the investment objectives, additional constraints (beyond risk-return and capacity) might need to be applied either directly through quantitative optimization or through a qualitative overlay. Such constraints might include minimum liquidity features (e.g., regular cash coupons), limitations on geographic areas, currencies, concentration (e.g., diversification), and industry or sector exposure, as well as limits on interest rate, spread duration or certain ESG factors. In our case study, we impose additional constraints on the allocation to niche specialty finance strategies (e.g., complexity) and require spread duration to be in line with the replaced credit portfolio (e.g., alignment of opportunity costs).

Constructing a private debt portfolio

Equipped with risk, return and correlation data, as well as capacity estimates for various private credit segments and implementation constraints, we will now illustrate how private debt portfolios can be constructed to fulfill different investment objectives and the benefits they can bring to the total portfolio.

FIGURE 5: NET SPREAD AND CAPACITY



Sources: StepStone Group and GIC, as of June 2023.

The upper chart shows, for a given cluster, the available capacity on an annual basis and the net spread of the different strategies. The lower chart maps cumulative capacity against spread levels. The chart indicates that depending on the annual deployment volumes, lower-yielding assets need to be considered to achieve the deployment targets.

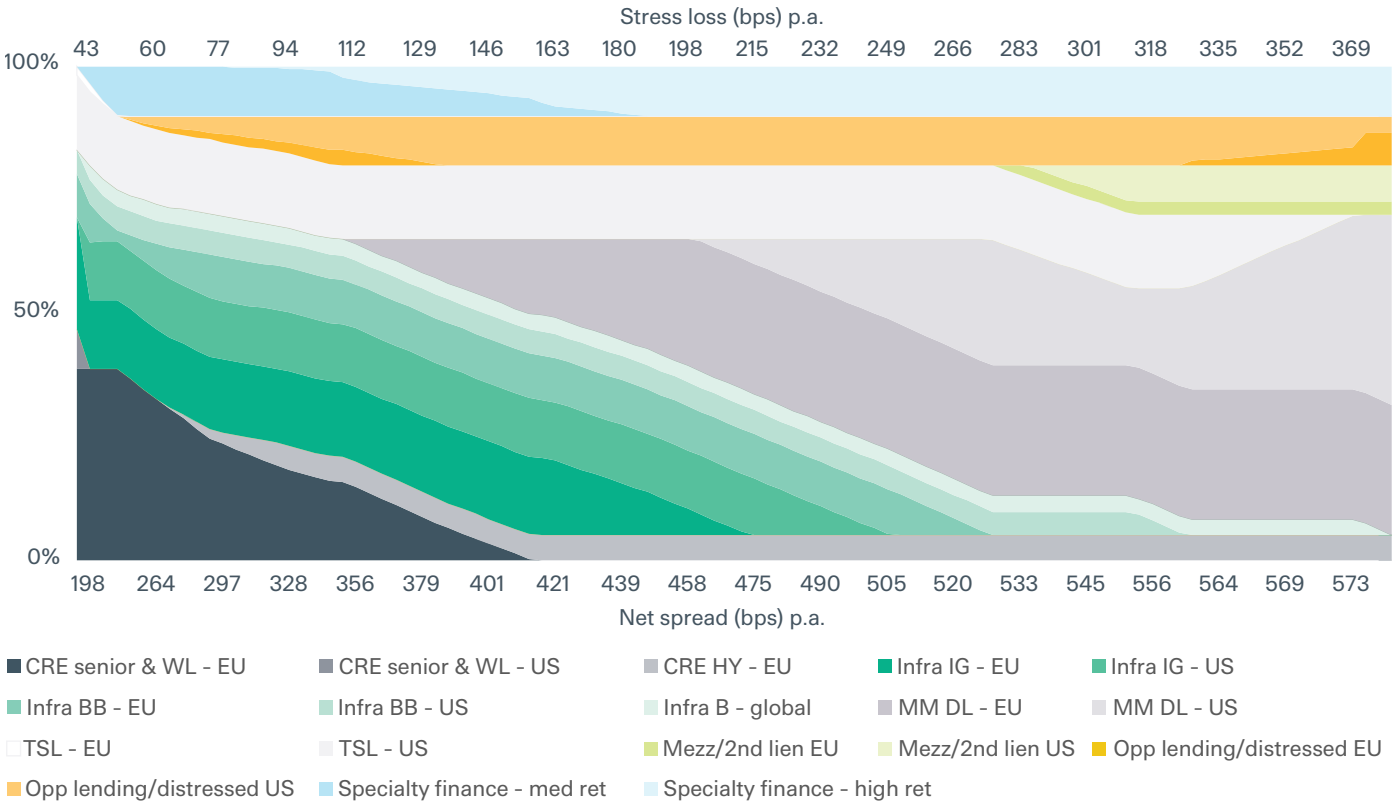
EFFICIENT FRONTIER OF PRIVATE DEBT PORTFOLIOS

By applying traditional optimization techniques, we can determine the private debt portfolio mix that seeks to maximize return for each level of stress loss. This builds the net spread–stress loss efficient frontier for private credit. **Figure 6** illustrates how the underlying allocation changes as expected return/net spread increases. As expected, higher net spread targets lead to optimal allocations with larger weights to higher-risk/higher-return types of credit such as corporate second lien, distressed/opportunistic credit, and high-return specialty finance.

However, traditional optimization methods (e.g., constrained quadratic optimization) face practical limitations. One such limitation is the tendency to produce "corner solutions," which refer to highly concentrated portfolios with large weights assigned to a small subset of assets. These corner solutions may not match the level of diversification that investors seek to achieve. Furthermore, quadratic optimization can be highly sensitive to small changes in input parameters, such as expected returns and covariance estimates. As a result, practitioners often employ additional techniques, such as shrinkage or resampling methods, to improve the stability and robustness of the optimization.

We mitigate these shortcomings and improve robustness[6] by taking the average of near-optimal portfolios, rather than the single optimal solution for any target level of risk-return. Near-optimal portfolios refer to a set of portfolios that exhibit risk and return profiles close to the optimal portfolio on the efficient frontier. However, they may have entirely distinct asset compositions compared with the optimal portfolio.

FIGURE 6: OPTIMAL PORTFOLIO COMPOSITION AT DIFFERENT LEVELS OF EXPECTED NET SPREAD

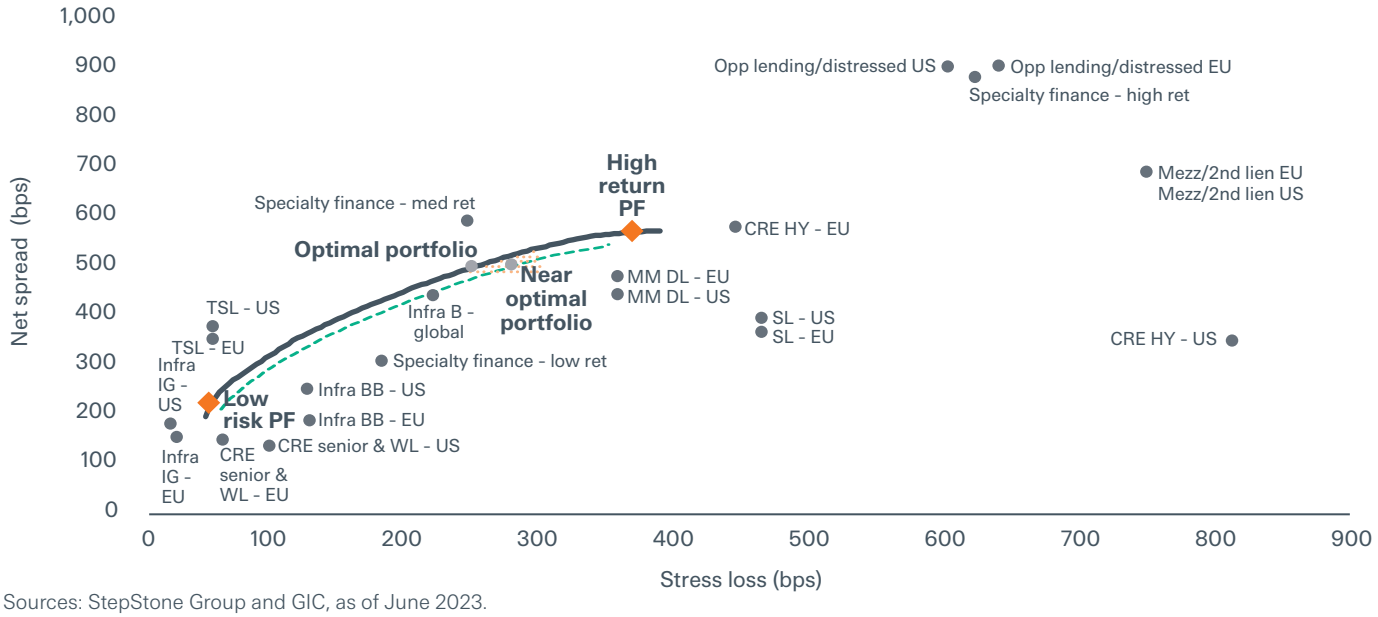


Sources: StepStone Group and GIC, as of June 2023.

[6] We test the robustness of the optimal and average of "near optimal" portfolios in Appendix C.

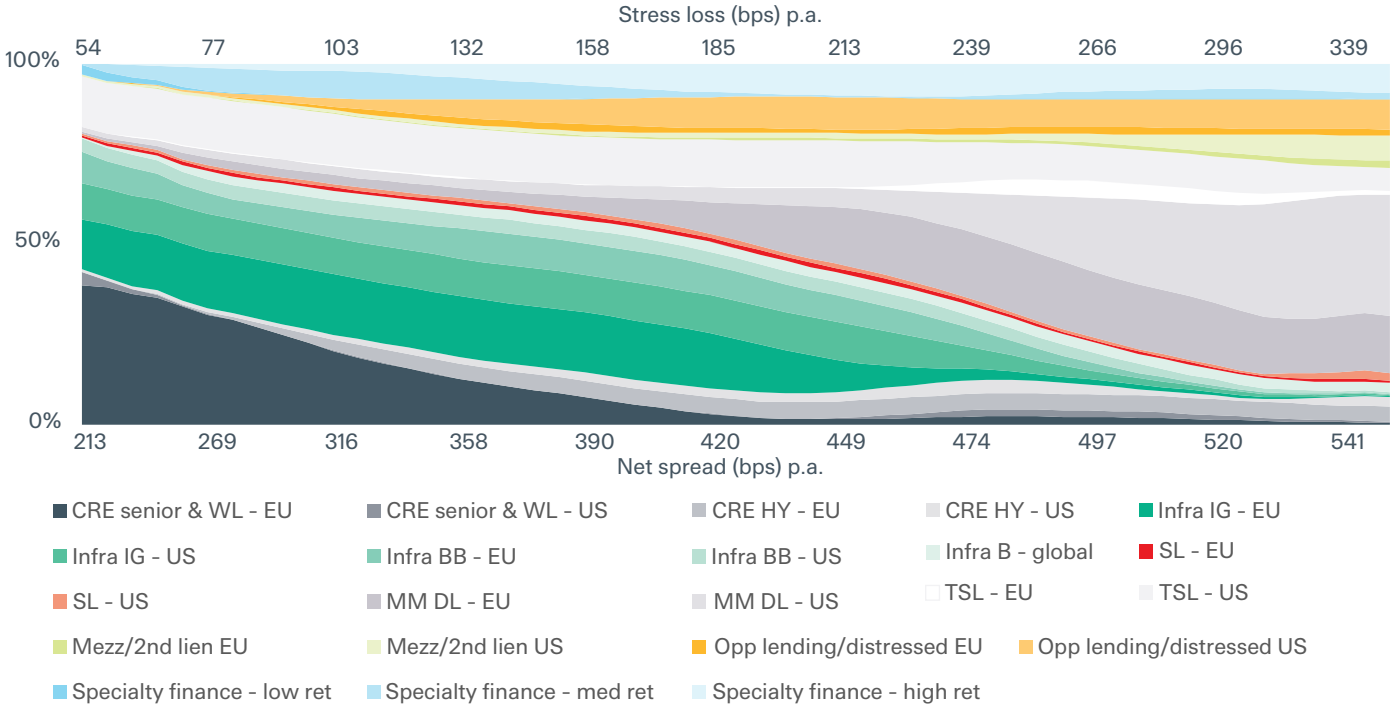
Averaging such portfolios to arrive at the target composition thus improves robustness by reducing concentration risk and sensitivity to changes in input parameters. Extending this to the entire efficient frontier as shown in **Figure 7** allows us to arrive at the range of robust compositions for all levels of risk-return in **Figure 8**.

FIGURE 7: ROBUST VS. EFFICIENT FRONTIERS. A ROBUST FRONTIER IS BASED ON AVERAGING NEAR-OPTIMAL PORTFOLIOS, WHICH REDUCES MODEL ERROR SENSITIVITY



Sources: StepStone Group and GIC, as of June 2023.

FIGURE 8: ROBUST PORTFOLIO COMPOSITION AT DIFFERENT LEVELS OF NET SPREAD – CLUSTERED



Sources: StepStone Group and GIC, as of June 2023.

Optimization provides a first indication of feasible implementation, which should satisfy the investment constraints. However, an overlay step is often still required to account for practical aspects that are difficult to incorporate into the optimization process. For example, looking at the allocations in Figure 8 for low net spreads, a low allocation to distressed/opportunistic strategies is recommended. Optimization suggests a barbell strategy with a dominant low cash-yielding allocation and a smaller high-return strategy relying on capital gains for return generation. Despite making sense from a pure optimization viewpoint, such an allocation may not make sense in a low-volatility portfolio focusing on stable and predictable income, as loss rate dispersion is higher. Replacing the distressed allocation with a cash-yielding direct lending allocation may be more aligned with the portfolio's objectives. Other aspects to consider are mandate sizes and asset-level concentration.

In principle, such considerations could be integrated into the optimization process. However, the more such implementation details are added to the optimizer, the harder it becomes to understand the relationship between inputs and outputs. For this reason, we prefer to address practical considerations in a qualitative step after the formal optimization. For the portfolios presented in the next section, the following considerations have been made:

Portfolio focused on risk reduction: The optimized real estate allocation is tilted toward Europe, which is driven by the fact that US real estate experienced higher stress losses during the GFC. This may not necessarily hold to the same degree in the future. Also, deployment is stronger in the US. Hence, we propose a more equitable traditional senior lending (TSL) allocation. Similarly, we suggest a more equal geographic traditional senior lending allocation. The small B-grade infrastructure (e.g., Infra B-Global) and the medium-return specialty finance (e.g., SF-Med Ret) allocations are not aligned with the spirit of a low-risk portfolio. Hence, we suggest removing these allocations.

Portfolio focused on return enhancement: The robust optimization suggests TSL as well as direct lending (DL) allocations that have the same return driver, but direct lending has higher spread. We propose to implement the senior corporate debt allocation via direct lending. The optimization output also suggests several small allocations. We suggest either increasing the size of these allocations to make them more impactful or removing them altogether.

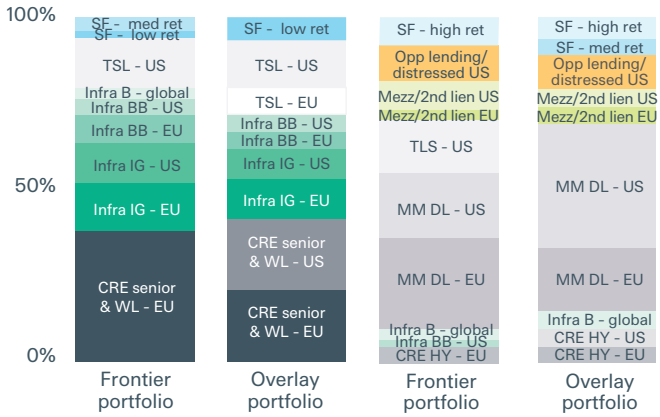
The two resulting portfolios are in the risk-return diagram in **Figure 7** (marked as low-risk and high-return portfolios). As a result of the overlay decision the portfolios will typically lie on neither the optimal nor the robust frontier.

INTEGRATING PRIVATE DEBT INTO INVESTORS' ASSET ALLOCATION–A CASE STUDY

After defining the robust private debt portfolio for each level of risk, the next step is integrating private debt allocation into an investor's portfolio with consideration of its objectives and constraints. This section discusses how this can be done and highlights the risk-return enhancements that private credit can bring.

The starting point is a simplified institutional portfolio with a 60/30/5/5 allocation to equity, government bonds, investment-grade (IG) credit and high-yield (HY) credit, respectively — in

FIGURE 9: QUALITATIVE OVERLAY USED TO DETERMINE ALLOCATIONS FOR PORTFOLIOS FOCUSED ON RISK REDUCTION AND RETURN ENHANCEMENT



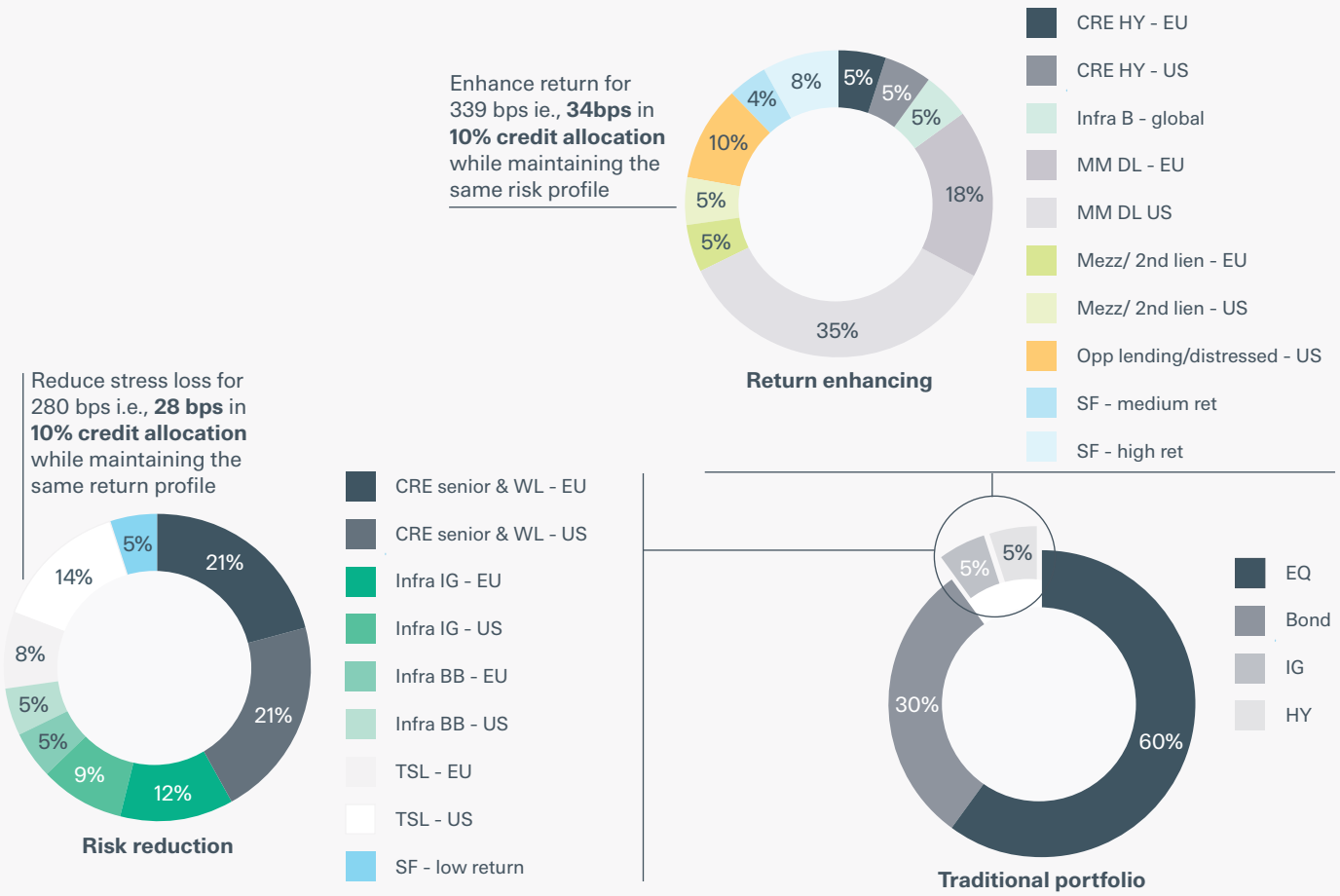
Sources: StepStone Group and GIC, as of June 2023.

other words, a public portfolio with a 10% allocation to public credit consisting of half IG and half HY bonds.[7] We then look at the impact of replacing the 10% public credit allocation with two private debt allocations, each serving a different objective: to enhance return without increasing risk and to minimize risk without sacrificing return. This is done by deriving two optimal private debt compositions with the same levels of stress loss and net spread as the IG/HY credit. In reality, investors can set objectives that straddle the two examples used here (to seek both higher returns and lower risk). In addition, we have ensured that the private debt allocation does not have longer spread duration than the public credit portfolio it replaces.

As shown in **Figure 10**, the return-enhancing portfolio delivers higher returns by 339 bps compared with the public IG/HY bond mix while maintaining the same level of stress loss. As such, replacing the 10% public credit allocation with this private debt portfolio will improve total portfolio return by 34 bps while maintaining the same level of risk.

If an investor's objective is to reduce risk rather than enhance return, a private debt allocation can also help. Importantly, this risk reduction is not the result of valuation smoothing; rather, it is from a lower default loss compared to the public credit mix with a similar level of return. Figure 10 shows that the private

FIGURE 10: POTENTIAL BENEFIT OF REPLACING PUBLIC DEBT WITH A PRIVATE CREDIT PORTFOLIO



Sources: StepStone Group and GIC, as of June 2023.

[7] One can perform the same analysis for other starting SAA and portfolio allocations. The mix here is for illustration and represents a stylized 60/40 type of investor.

credit portfolio focused on risk reduction has a lower level of stress loss by 280 bps compared with a public IG/HY while generating the same level of return. Replacing the 10% IG/HY allocation with this risk-reducing portfolio will hence reduce total portfolio stress loss by 28 bps.

Implementing private debt allocation

While determining the asset allocation is a crucial element in building a private debt portfolio, we believe that additional process elements need to be in place to execute a private market program. These include:

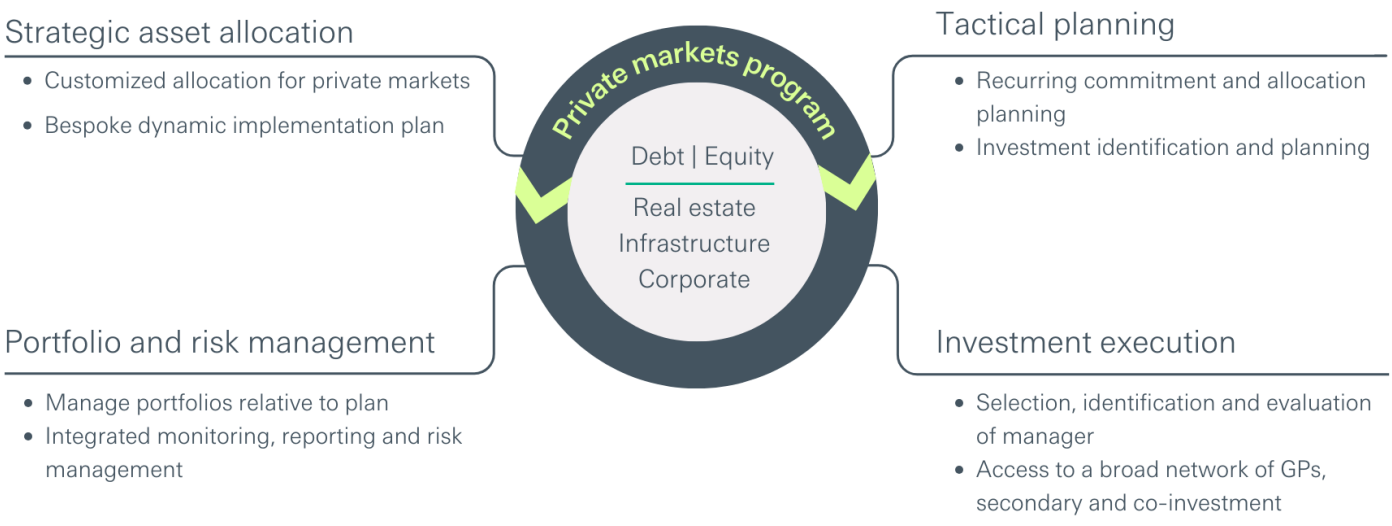
- **Manager/fund selection** to maximize returns and reduce impairment/default risk;
- **Strategic deployment pacing** to implement the target allocation efficiently; and
- **Tactical tilting** to take advantage of evolving risk-reward across segments.

As it is challenging to do so effectively given the diverse and, at times, niche nature of private credit assets, specialist advisers can be tapped to manage all or a selected part of the process. We elaborate on the nuances of implementing a strategic allocation and complementing it with tactical tilting below.

EFFICIENT IMPLEMENTATION TO MINIMIZE OPPORTUNITY COST

Once the strategic asset allocation has been established, it is essential to develop an implementation plan to attain the desired portfolio composition. Unlike public markets, deployment of a private debt portfolio is not immediate and may take several years. Investors might incur substantial opportunity cost as undeployed commitments are often held

FIGURE 11: CRITICAL ELEMENTS FOR IMPLEMENTING A PRIVATE MARKET PROGRAM



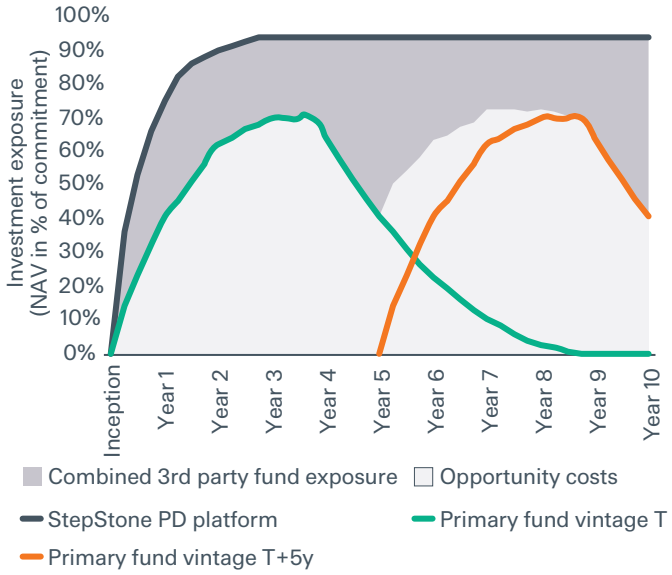
Sources: StepStone Group and GIC, as of June 2023.

in low-yielding assets such as cash or investment-grade corporate bonds. In addition, most funds start repayment before the amounts are fully deployed, and the closed-end nature of these funds leads to substantial reinvestment risk. These challenges are illustrated in **Figure 12**.

The conventional measures used in private market investments such as the internal rate of return (IRR) or total value to paid in (TVPI) do not capture the opportunity costs, and optimizing along these metrics might lead to suboptimal results at a portfolio level. To overcome this, we recommend using multiple on committed capital (MOCC) as an additional metric. MOCC measures the portfolio's earnings (in dollar terms) against the investor's commitment and thus accounts for opportunity costs of undeployed capital. Since income is earned only on invested capital, funds with a rapid deployment speed and (continued) high exposure levels compare favorably based on this metric, all else being equal. This is demonstrated in **Figure 13**.[8] In this chart, we calculate the MOCC for different IRRs of a typical credit fund. These MOCCs are then compared with the MOCC of an efficient deployment strategy. The analysis shows that to break even, a typical fund needs an approximately 50% higher IRR (10.7% vs. 7%) compared with a fast-deployment solution to achieve the same result.

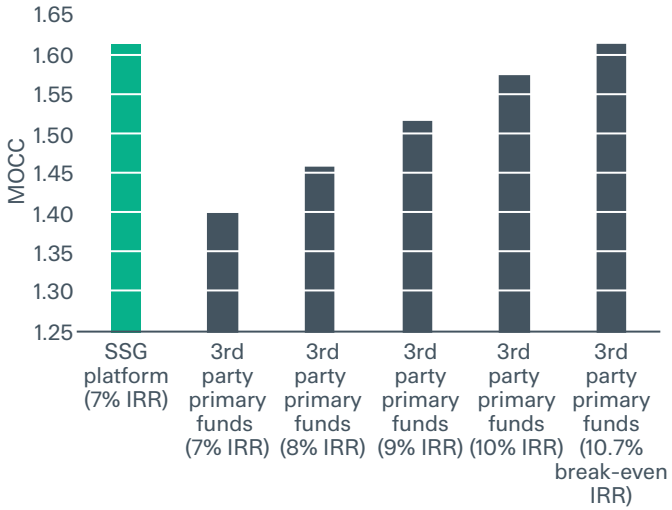
Apart from incorporating realistic capacity constraints in the strategic asset allocation process to ensure that the overall allocation can be executed in practice, investors should also carefully manage their deployment pace and find the optimal path to reach and maintain their target allocation while achieving sufficient diversification and increasing MOCC. In this regard, access to a diversified list of GPs, sectors and strategies, as well as an ability to rotate commitments across managers, alongside sophisticated tools, and metrics to optimize pacing, are essential.

FIGURE 12: ILLUSTRATIVE OPPORTUNITY COST OF SUBOPTIMAL DEPLOYMENT TO REACH AND MAINTAIN TARGET ALLOCATION



Sources: StepStone Group and GIC, as of June 2023.

FIGURE 13: ILLUSTRATIVE BREAK-EVEN RETURN RATES FOR DIFFERENT AMOUNTS OF INCOME GENERATED ON COMMITTED CAPITAL



Sources: StepStone Group and GIC, as of June 2023.

TACTICAL ALLOCATION TO ENHANCE RISK-REWARD

Building a private market portfolio is a gradual process that occurs over several years. Besides scaling up and maintaining the strategic credit allocation, investors can tilt their portfolios tactically to capture short-term dislocations and enhance returns. Investors can monitor changes to market fundamentals, valuations and technicalities and hence develop near-term assessments of risk-reward across segments.

[8] MOCC measures income generated on committed capital and accounts for opportunity costs of undeployed capital. The analysis shows break-even rates between an average fund and a fast-deploying solution. To reach breakeven a roughly 50% higher IRR (10.7% vs. 7%) is needed to achieve the same result.

Figure 14 shows net spreads as of mid-2022 for selected assets and compares them to through-the-cycle net spread expectations. Real estate lending and syndicated loans had experienced, at that point, the most spread widening as a result of the market environment. For investors seeking to enhance returns and capture market dislocations, they can tilt their deployment toward more attractive segments accordingly, as illustrated in Figure 14.

We believe credit markets can be a fruitful space to implement tactical allocation shifts because:

1. They are cyclical, and credit spreads evolve in tandem with changes in the macro environment and market sentiment.
2. Private debt portfolio returns (in a buy-and-hold fashion) are driven by coupon income net of losses and are therefore less volatile than equity returns, which are driven by growth expectations, interest rates and sentiment.

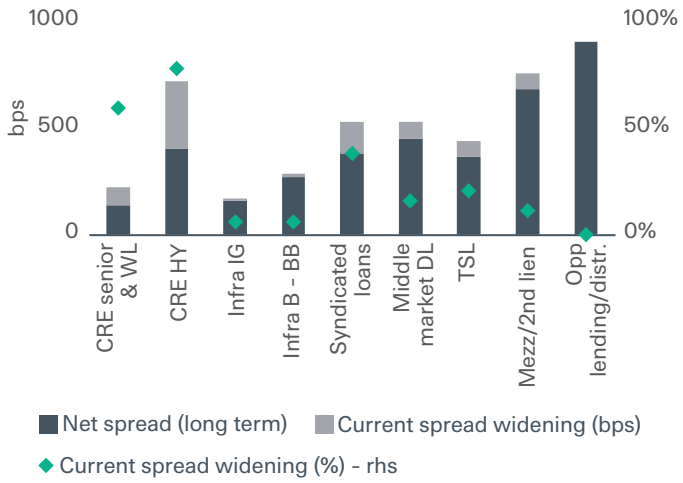
However, most private market funds are commitment-based. While new commitments can be tilted toward more attractive segments of the credit market, existing commitments cannot be adjusted. This implies that implementing tactical decisions is more difficult than at first glance. Therefore, implementation matters even more for tactical allocation than for strategic asset allocation.

Tactical opportunities typically last for a couple of quarters at most so time-to-market is a critical success factor. Given that implementation through primary fund commitments faces limitations, the preferred strategies for implementing tactical decisions are co-investments and secondaries. This requires timely identification of opportunities, existing relationships with GPs where allocations are sought, and investment vehicles (ideally SMAs) that are set up and ready to make allocations.

Conclusion

This paper aims to offer a guide for institutional investors to design and implement private debt allocations.

FIGURE 14: MID-2022 NET SPREADS VS. LONG-TERM NET SPREADS ACROSS THE PRIVATE DEBT SPECTRUM



Sources: StepStone Group and GIC, as of June 2023.

We start by laying out the private credit landscape across sectors, the capital structure and geographies. While the investment universe is highly granular and heterogeneous, clustering sub-strategies with similar return/reward profiles allows us to reduce complexity.

We then propose fundamental risk and return measures—net credit spread and stress loss—as the key metrics to assess risk-reward across segments. These metrics serve the dual function of being aligned with portfolio managers' underwriting approach that focuses on credit losses, while allowing fair comparison with other asset classes in a global multi-asset portfolio. With these risk-return metrics as well as capacity assumptions, we then determine robust compositions at varying levels of risk. The need for a qualitative overlay step is outlined based on a low-risk and a high-return portfolio, respectively. Through a case study, we illustrate how an investor can integrate private debt into their portfolio.

Finally, we highlight important implementation considerations, including efficient pacing and the use of tactical overlays, which are crucial to achieving the desired allocation to credit as well as enhancing portfolio returns.

Appendix

APPENDIX A. CORRELATIONS

The next section provides additional color on the use of public proxy indexes to define correlations. **Figure 15** lists proxy indexes for selected private debt assets, and **Figure 16** shows the correlation matrix between these indexes.

The average correlation between asset classes is 0.34, and the average correlation within real estate and infrastructure assets is 0.53. Correlations within corporate credit are higher. Considering this, our modeling makes the following correlation assumptions:

Correlation between different asset classes:	0.25
Correlation within real estate and infrastructure in different regions:	0.50
Correlation within real estate and infrastructure in the same region:	0.65
Correlation within corporate debt assets in different regions:	0.80
Correlation within corporate debt assets in the same region:	1.00

FIGURE 15: LIST OF LIQUID PROXIES FOR SELECTED PRIVATE DEBT ASSETS

Strategy	Benchmark
Real estate debt	Markit iBoxx CMBS Eurpoean index EUR
	Barclays US CMBS investment grade index
Infrastructure debt	Markit iBoxx infrastructure BBB EUR
	Barclays US aggregate investment grade index: utility
	Bloomberg Barclays high yield utilities B index
	CS Western European leveraged loan index
Corporate debt	CS leveraged loan index
	CS leveraged loan index by rating split CCC

Sources: Markit iBoxx (available from February 2007), Bloomberg (available from February 2006), Barclays (available from February 2022) and Credit Suisse.

This approach might risk underestimating the correlation of stress losses. Investors can address this risk by examining a portfolio's loss potential under a perfect correlation scenario.

FIGURE 16: CORRELATION MATRIX OF LIQUID PROXIES

		1	2	3	4	5	6	7	8
1	Markit iBoxx CMBS European index EUR	1	0.47	0.18	0.08	0.19	0.13	0.04	0.20
2	Barclays US CMBS investment grade index	0.47	1	0.39	0.43	0.39	0.41	0.44	0.37
3	Markit iBoxx EUR infrastructure BBB TRI	0.18	0.39	1	0.66	0.44	0.54	0.50	0.44
4	Barclays US aggregate investment grade index: utility	0.08	0.43	0.66	1	0.48	0.42	0.35	0.17
5	Bloomberg Barclays high yield utilities B index	0.19	0.39	0.44	0.48	1	0.46	0.55	0.42
6	CS Western European leveraged loan index	0.13	0.41	0.54	0.42	0.46	1	0.91	0.70
7	CS leveraged loan index	0.04	0.44	0.50	0.35	0.55	0.91	1	0.79
8	CS leveraged loan index by rating split CCC	0.20	0.37	0.44	0.17	0.42	0.70	0.79	1

Sources: Markit iBoxx, Bloomberg, Barclays and Credit Suisse. Monthly returns for the time period spanning from January 2000 to December 2021.

APPENDIX B. RISK MEASURES

The ideal risk measure needs to fulfill two roles, in our opinion:

1. The deal team and portfolio managers need to understand and subscribe to the same measure. It needs to be in the same language they use to underwrite deals.
2. The measure needs to allow fair comparison with other asset classes, public or private, and hence be used in portfolio optimization.

When thinking about risk measures, typically, concepts used for liquid asset portfolios such as volatility, tail loss (e.g., VaR, CVaR) and shortfall come to mind. These measures are widely accepted, and hence it is not surprising that private market investors try to rely on these measures as well. However, data sparsity and the lack of regular pricing make their use challenging, however. Investors often apply these measures to private assets by performing statistical de-smoothing to accounting-based return series or by using public market indexes as proxies. While they may satisfy the second role of consistency with public markets, they fail the first. Proxies fall short as they present significant model risks—choice of public market proxy can be subjective and limited, with available proxies a poor representation of private debt assets. When defining the appropriate risk measure for private credit assets, we find it helpful to keep stylized risk profiles in mind.

As mentioned, return expectations are expressed in terms of a net spread that includes a long-term expected loss rate assumption. Short-term realized credit losses can, however, materially exceed these long-term average loss rates. We refer to these losses as stress losses or excess stress losses if quoted in excess of long-term expected losses. They typically

FIGURE 17: ILLUSTRATIVE BEHAVIOR OF DIFFERENT MEASURES OF RISK DURING A STRESS PERIOD

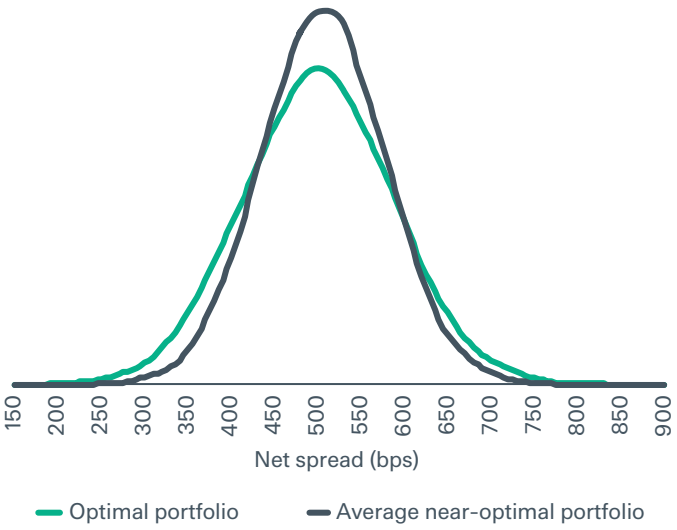
Sources: StepStone Group and GIC, as of June 2023.

occur as a result of slowing economic growth and show up as deteriorating fundamental performance of companies before losses occur. To account for such underperformance, lenders normally start to build provisions for future losses and mark down underperforming assets. History suggests that valuation adjustments reach about twice the amount of actual credit losses and occur about 12 months earlier. Prices of comparable traded assets adjust yet a few months earlier, and drawdowns significantly exceed valuation adjustments observed in private markets. This stylized example illustrates the inconsistency of valuation-based risk measures and motivate the use of stress losses, which have meaning independently of whether an asset is traded or not.

APPENDIX C. ROBUSTNESS TESTING

The concept of near-optimal portfolios has the objective, among others, produce a more robust portfolio. Robustness can be interpreted as lower sensitivity to errors in the specification of the inputs, specifically spreads, losses and correlations. We use Monte Carlo simulations to compare the robustness of both optimal and near-optimal portfolios generated through the asset allocation process. Through simulated net spreads for each strategy, we generate the distribution of portfolio net spreads for both optimal and near-optimal portfolios to evaluate the stability and robustness of allocations. As illustrated in **Figure 18**, the optimal portfolio exhibits a higher dispersion of portfolio net spread, suggesting a lower level of robustness compared with the near-optimal portfolios. These findings indicate that the average of the near-optimal portfolios provides more robust portfolio allocations than the optimal portfolio on the efficient frontier.

FIGURE 18: ROBUSTNESS TEST OUTPUT



Sources: StepStone Group and GIC, as of June 2023.

APPENDIX D. DEPLOYMENT BENCHMARK

The deployment benchmark, which reflects net contributed capital or net called, is derived from Preqin fund data with a focus on senior secured first-lien direct lending, (e.g., distressed and other strategies have been excluded from the calculation). Funds included in the analysis also need to have at least three years' history and (almost) complete time series. In case of single data gaps, a linear approximation is being used. Based on those quality requirements, the final sample includes around 80 funds. To determine the deployment levels, the average capital called is calculated per quarter. In the case the reported capital called shows gross figures (i.e., includes the recycled capital) an adjustment is being made. The adjustment is derived from the average cash flow profiles of the loans (including repayments) and amounts to 16% within one year, 27% between years 1 and 2, and 23% between years 2 and 3. On this basis the following deployment benchmark is obtained:

FIGURE 19: DEPLOYMENT BENCHMARK GIVEN THE AVERAGE AMOUNT OF CAPITAL CALLED PER QUARTER

Partially adjusted for repayments averages	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Average	13%	22%	31%	39%	44%	49%	54%	61%	63%	65%	66%	68%

Sources: StepStone Group and GIC, as of June 2023.

APPENDIX E. GLOSSARY

bps	basis points, equal to 1/100th of 1%
CRE	Commercial real estate
CVaR	Conditional value at risk
DL	Corporate direct lending, cash-flow lending to middle-market companies
ESG	Environmental, social & governance
GFC	Global Financial Crisis
GPs	General partners
HY	High yield
IG	Investment grade
IRR	Internal rate of return
LPs	Limited partners
Mezz	Mezzanine
MM	Middle and lower middle market
MOCC	Multiple on committed capital
NAV	Net asset value
SAA	Strategic asset allocation
SF	Specialty finance (includes asset-backed lending, NAV lending, others as in Figure 1)
SL	Syndicated loans
SMA	Separately managed account
TSL	Traditional senior lending
TVPI	Total value to paid-in
US	United States of America
USD	United States dollar
VaR	Value at risk
WL	Whole loan

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